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The effect of a training program in achievement motivation on the academic performance of underachieving high school boys is presented. Twenty boys with IQs above 120 and school grades below C received the training program in addition to an academic summer school program. They were compared to a control group of 37 similar boys who received only the academic program. A six-month followup revealed no significant differences between the groups in improvement in school grade average. In a one-and-one-half year followup, the total grade average of experimental subjects improved significantly more than that of controls. Large social class differences were found. The grades of high social class experimentals improved significantly more than those of high controls, while low experimentals did not increase more than low controls. In the experimental group, improvement in school grades was significantly correlated with participation variables.

One of the games used to help these boys was the race game. It consisted of a miniature race track around which small electric cars could be driven. The boys, controlling the speed of their cars, raced against each other. The boy with the fastest time was the winner. As they raced the boys were asked to keep in mind the characteristics of the achieving personality in relation to the race: personal responsibility (how involved I am in the race); moderate risk-taking (how much of the time did I take too much of a risk); and ability to use knowledge of results (how well did I use my practice trials to judge my ability).

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# Achievement Motivation Training for Underachieving High School Boys[1]

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A substantial body of research using widely differing measurement techniques has indicated that underachieving students are low in their motivation and/or concern for achievement (Burgess, 1956; Garrett, 1949; Gebhart & Hoyt, 1958). In addition, a number of studies have demonstrated a small but positive significant relationship between achievement motivation and academic performance in high school (Atkinson, 1958; McClelland, Atkinson, Clark & Lowell, 1953; Uhlinger & Stephens, 1960). The present study tests the effect of a training program designed to increase concern for academic achievement in a group of underachieving high school boys. The content of the training program derives from the research on achievement motivation carried on by McClelland and his associates (Atkinson, 1958; McClelland et al., 1953; McClelland, 1961). A study by Burris (1958) suggests that counseling centered around a student's n Achievement score can produce significant changes in his academic performance. Burris found that the grades of college underachievers who received n Achievement counseling improved significantly more than those of similar students who received nondirective counseling.

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The training techniques used in this program stem from four different experimental backgrounds.

1. Identification. The identification models of Kagan (1958) and Hill (1960) maintain that learning takes place through emulation of effective role models, this learning being reinforced through vicarious effective experience. Goldberg (1959) has found that identification with a positive role model seems to be associated with academic improvement in underachieving boys.

2. Expectation. There is a growing body of research which indicates that the expectations held by the experimenter and subject (Rosenthal, 1963; Orne, 1962) or the therapist and patient (Goldstein, 1962) can measurably affect the outcome of the experiment or therapy. The studies by General Electric at their Hawthorne plant (Roethlisberger & Dickson, 1947) indicate that being a part of an experimental investigation in itself improves subjects' performance. In this study the research team model developed by Schwitzgebel and Slack (1960) was adapted. As an attempt to involve the subjects in the hypothesis of the experiment, they were encouraged to see themselves as research collaborators. They were informed, "Previous research prescribes that if you increase your concern about achievement you will increase your academic performance." The experiment was "biased" to increase academic performance. The role relationship adopted was not therapist and patient but experimenter and subject.

Every attempt was made to increase the Hawthorne effect. Schwitzgebel (1962) has found the research team model useful in reducing juvenile delinquency.

3. Idiomotor response. The hypothesis that thought determines action has a long history in psychology. Braid maintained that an idea firmly implanted in the mind during hypnosis later issues into behavior. Through the influence of Hebart, nineteenth century educational psychology promoted the copy book to implant in children's minds the "right ideas" which would lead to "right actions" (Allport, 1954). William James formulated a Think-Talk-Act model recently elaborated by Leary (1961b). Perhaps the most sophisticated modern statement of this theory is George Kelly's role construct theory (1955). He maintains that behavior is determined in large measure by the way a person construes the world. The Burris study (1958) suggests that teaching underachievers achievement constructs and encouraging them to think in achievement terms can lead to better performance in school.

4. Games. The use of games to simulate life situations is becoming more and more prevalent in the training of managers and administrators, military leaders, diplomats, and others requiring complex skills (Bensen, 1962; Kibbe, Croft & Nanus, 1961; Sprowls, 1962). These games provide a well-defined, psychologically safe situation where men can try out new ways of thinking and behaving. In this study the game concept was used in two ways: (a) in actual games

designed to teach achievement skills (e. g. Litwin & Ciarlo, 1961), and (b) as an analytic device in counseling to aid in understanding real life problems (Leary, 1961a).

## Method

### Setting

The Achievement Motivation Training Program (AMTP) was carried out as part of a summer school for underachieving high school boys held at Brown University. The summer school was designed to give stimulating instruction using outstanding teachers and exciting subject matter. In addition, the planners of the program hoped that exposure to college living and positive college role models (counselors were chosen to be outstanding in both scholarship and athletics) would increase the underachievers' desire to go to college.

The project was six weeks long, beginning in late June and ending in the first week of August. The schedule was a five-day week of classes in history, English, and mathematics, with weekend recreation at various parks and beaches in the area. The boys lived together on three floors of a college dormitory on the campus and ate in the college dining hall.

### Subjects

Fifty-seven boys drawn mainly from public and private schools in New England were enrolled in the project. These were selected from 95 applicants on the basis of IQ (120 or higher) and school grade average (C or lower). Boys with serious reading defects were generally

not admitted. Attempts were made to screen out applicants with serious psychiatric problems. Two general classes of students were recruited: (a) boys from homes where sufficient interest, parental background, and finances favored college entrance, and (b) boys from homes where these were lacking. Parents of the first type were requested to pay tuition, room, and board. Lower class boys were granted scholarships to cover their expenses. About half of the participants received scholarships.

A breakdown by social class based on occupation (Warner, Meeker, & Eells, 1949) shows fourteen boys in class 1, eleven in class 2, eleven in class 3, five in class 4, six in class 5, two in class 6 and one in class 7. This skewed distribution probably reflects the fact that parents of lower class children value education less (Kahl, 1952) and therefore are not likely to apply to such a program. The mean IQ score (WISC) of the boys was 126 (range 109-149) and their mean school grade average was D to D+ (range F to C+). The average year in school was 9.0 (range 7-11) and their average age was 14 years (range 12 to 16). Stanford Achievement Test scores showed them to be at an average grade level of 10.9 (range 8.8 - 12.7).

Experimental Design

Twenty of the 57 students were randomly assigned to the fourth floor of the dormitory. This group received the AMTP in addition to their regular summer school schedule. The remaining 37 students

received only the regular summer school program.

Subjects were tested in the following manner.

Pretesting. On the second day of the summer school, 57 Ss were given the following tests: (a) the Test of Insight, Form A (this test was an adaptation of the form used by French (1958) and was scored for n Achievement according to the published scoring manuals (Atkinson, 1958); (b) the Stanford Achievement Test; (c) the Taylor Manifest Anxiety Scale (MAS); and (d) the Mandler-Sarason Test Anxiety Scale (TAS). In addition the following data were collected for each S: age, year in school, IQ (WISC), 1961 school grade average, and parents' socio-economic status based on father's occupation (Warner et al., 1949).

August 1961 Posttest. On the next-to-last day of the project, Ss were given the following tests: (a) the Test of Insight, Form B, a parallel form; (b) the Stanford Achievement Test; (c) the MAS; and (d) the TAS. In addition all Ss received grades in each of the three subjects taught in the summer school. AMTP members were ranked on their participation in the AMTP and assessed in moderate risk-taking ability using the Litwin-Ciarlo Business Game (1961).

January 1962 Followup. The mid-year school grades were collected for all boys who completed the project.

April 1962 Followup. At this time 33 of the summer school participants were selected on the basis of proximity to Brown University to return for a testing session. Twenty-seven boys returned (Experi-

mentals = 10, Controls = 17) and were given the Test of Insight, Form A. January 1963 Followup. School grades were collected for the Spring 1962 semester. Unfortunately these were available for only 37 boys (Experimentals = 12, Controls = 25).

To check for n Achievement scoring reliability, a sample of 30 Tests of Insight (10 from each testing period) was scored by a trained scorer not connected with the training program. Scores thusly obtained correlated (rhc) .85 with E's scores.

School grades were all converted to a numerical scale: A=95, B=85, C=75, D=65, E or F=55.

Experimental Condition--the Achievement Motivation Training Program

E lived in the dormitory with the AMTP boys and served as their counselor. E behaved in a manner consistent with the behavior of a person with high n Achievement, so that the Ss would have a visible high n Achievement role model to imitate.

The procedure changed from the use of external rules and discipline to internal control and personal responsibility. Structured classes and required meetings gradually gave way to individual appointments made at an S's request and optional group meetings. Responsibility for running the fourth floor and the AMTP was gradually given to the boys themselves. After a few initial required meetings the boys were free to choose how much they wanted to participate in the program. This policy reflected the research team contract (see below) and

was further encouraged by the time limitations of E. It was felt that time would be more profitably spent working with interested students than trying to involve those who were not interested.

Initially the boys met with E in a classroom twice a week for one hour. As the weeks progressed this meeting time was changed to better fit the summer school schedule and meet the needs of the boys. The program is described below in detail.

First Session

The first session was concerned with negotiating a contract. The role relationship emulated was that of a team doing collaborative research on the problem of underachieving. The essence of the contract was this:

We at Harvard have some ideas about how to help the underachiever play the school game better. Our goal is to try out these ideas to see if they work, and to discover new ways to prevent the problems associated with underachievement. If you will work with us we think that we can, in return, introduce you to some strategies which will help you in school and, more generally, in life. Whether you want to do this or not is entirely your decision. Your involvement with this program is not required; you can participate to the extent to which you feel it is useful to you.

After negotiating the contract, the characteristics of a person with high achievement motivation were described. Ss were told that

the person with high n Achievement has three major characteristics: (a) he likes and chooses to take personal responsibility for his actions, (b) he takes moderate risks, and (c) he likes and attempts to obtain knowledge of the results of his actions (Atkinson, 1958; McClelland et al., 1953; McClelland, 1961). The remainder of the session was spent describing the racing car game Ss would play in the next session and suggesting how the characteristics of the person with high achievement motivation would be valuable to a racing driver.

Second Session.

The entire second session was spent playing the race game. The game consisted of a miniature race track around which small electric cars could be driven. The "racers" each had a transformer which controled the speed of his car. The boys raced against the clock two at a time. The boy in each pair with the fastest time was declared the winner. If by going too fast the boy left the track three times he was disqualified. As they raced the boys were asked to keep in mind the characteristics of the achieving personality in relation to the race, e.g., (a) personal responsibility--how involved am I in the race? do I care if I win or not? (b) moderate risk-taking--how much of the time did I take too much of a risk? how often was I too cautious? (c) using knowledge of results--how well did I use my practice trials to judge my ability?

Third Session

This session began with an introduction to the process of assessing motivation by analysis of thought (Atkinson, 1958). The boys were then shown how their n Achievement scores related to their performance in the racing game (boys with high n Achievement tended to finish the race while those with low n Achievement tended to be disqualified).

The discussion then turned to time orientation. During the previous evening the boys had estimated a thirty-second interval on a stopwatch. Ss with high n Achievement tended to see time as passing more quickly than Ss with low n Achievement. Further discussion centered around future orientation, delay of gratification, and ability to control impulses.

Fourth Session

This session marked the beginning of the shift from structured lecture meetings to a program oriented more toward the individual. In essence the session was a re-negotiation of the contract. The group's commitment to the "research team" model was re-affirmed, emphasizing the boys' role in determining the nature of the course. The followup and the E's interest in knowing the boys' future grades were discussed.

The last half of the session was spent discussing how thought influences action. The Think-Talk-Act model was explained: if you think and talk in a certain way you will act that way. In particular the

direct relationship of achievement thinking to achievement behaviors was discussed. At the end of this session the boys were given n Achievement scoring manuals.

Fifth Session

This session was devoted to a group discussion on the analysis of Test of Insight stories. Example stories from the protocols of control students were read to the class and discussed. Following this discussion the students were given their own Insight test protocols. They were offered help in scoring their protocols for n Achievement. The expert scoring was given to them upon request. The remainder of the hour was spent in teaching the n Achievement scoring system.

Sixth Session

A major theme that occurs over and over in the Insight is a conflict between achievement and affiliation goals (see Parsons, 1959). One of these stories is quoted below:

> He fools around alot to make friends and doesn't do his school work the best he can.--He didn't take school seriously and just had a lot of fun. He thinks more about making friends than about getting his homework done.. He probably wants to be a mechanic. His marks will keep slipping down and he won't get a good job when he gets out of school. (Written to Test of Insight, Form A, story 4)

The last half of this session was centered about learning to take realistic risks. An article on how to assess risks was given to the

class members. The group discussed risk-taking in terms of planning goals and strategies in life situations, making conscious decisions, taking action to attain desired goals, and knowing one's own ability. The Litwin-Ciarlo Business Game (discussed below) which they would all play later that week was described.

Informal Sessions.

Beginning on Thursday of the fifth week, the group began meeting every evening on the lawn on an informal basis. Attendance at these sessions was not required and Ss could come and go as they pleased. The boys wanted this arrangement so they could discuss how the techniques they had learned could be applied to specific problems in their lives. These discussions were intense and seemed to be of considerable benefit to those who attended. Approximately 12 out of the 20 boys attended regularly. The remainder had more or less dropped by the wayside.

Individual Counseling Sessions

Counseling on an individual basis was done informally. The problems discussed in individual sessions were usually concerned with the application of principles talked about in class to the life of the boy. These ranged from using the principles of moderate risk-taking to play a better tennis game, to setting realistic goals in study tasks, to staying out of arguments at home.

The Litwin-Ciarlo Business Game

This training device was perhaps the most popular aspect of the

whole project. It is designed to train a person to take moderate risks and use knowledge of results, and to assess his capacity to do so. The subject in this game plays the role of a manufacturer and actually builds the products he contracts for with tinkertoys. He is told that he is the head of a company just starting to manufacture three new products--a missile, an atomic cannon, and an airplane. He must order sufficient parts to build each of these products and actually try to assemble them in three separate five minute production periods. Only completed units are purchased, so if he orders too many he loses what is invested in the left-over parts, and if he orders too few his profit is lower than it should have been. The game takes an hour to play and gives scores on risk-taking and use of past performance as an indicator of future performance. A couple of boys learned to run the game and did a large part of the administration for the other boys.

## Results

Eight of the original 57 boys were not included in the final data analysis. Five of these boys (4 C's and 1 E) were dropped from the summer school for either disciplinary or emotional problems. The other three boys (2 E's and 1 C) completed the school but were so withdrawn or rebellious that they were rated unsatisfactory in all three of their courses.

### Initial Comparison of Experimental and Control Groups

To determine the success of random assignment, the experimental

and control groups were compared on all variables in the study. Using the Mann-Whitney U-Test, p values were greater than .20 (two-tailed) on the following variables: year in school, age, IQ (WISC), n Achievement, 1961 school grade average, average Stanford Achievement Test score, MAS, and TAS. A $X^2$ comparison of the two groups by social class (class 1 and 2 versus clas 3 to 7) yielded a p value of .50.

Comparison of Experimental and Control Group Changes

In Table 1 the n Achievement change scores are reported for experimental and control subjects, pretest to August postest and pretest to April posttest for the 27 subjects who attended that followup. It is assumed that this latter group represents an unbiased sampling of the total summer school population since they were selected on non-academic criteria--proximity of their home to the testing site. Note that the experimental group shows significantly greater increases in n Achievement score in both periods.

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Insert Table 1 about here

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Comparison of experimental and control changes on the Stanford Achievement Test from the pretest to August posttest indicated no significant differences either for total score or any subtest score although in most cases experimentals tended to improve more than controls. The two anxiety scales (TAS and MAS) also showed no significant

differential changes. An analysis of the final grades that the boys received in the summer school showed no significant differences.

In comparing changes in school grades, each boy received, whenever possible, a change score for five subject areas: English, science, foreign language, mathematics, and history/civics, plus a change score for his total semester grade average. Change scores for the subject areas were the average grade that the boys received in the courses he took in that area. Many times these subject change scores were not available because the boy would not have taken a given course in both the pretest and the followup periods. In Table 2, change scores for experimental and control groups are compared for the January 1962 followup and the January 1963 followup. Note that while in the January 1962 followup experimental boys had not improved significantly more in grade average than the control boys, by the January 1963 followup the experimental group's improvements in grade average were significantly greater than the control group's improvements. In addition, the mean experimental improvement increased from 1962 to 1963 while the mean control group improvement decreased in this period. In the subject areas, experimentals improved significantly more than controls in English while controls improved significantly more than experimentals in science in the January 1962 followup (contrary to prediction). None of these differences held in the January 1963 followup.

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Insert Table 2 about here

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In the 1963 followup, grades were available for only 73% of the subjects in the 1962 followup. One might question the validity of the 1963 change scores since ordinarily one would expect students who improved least to drop out in later followups. An analysis of the thirteen dropouts' change scores in the 1962 followup showed a non-significant trend in this direction--eight were below the 1962 total mean change and five were above. These boys, however, were evenly divided between the experimental and control groups (E = 2/4, C = 3/4). Thus we would suspect that any artificial increase in average change scores would not affect the experimental and control groups differentially.

The Effect of Social Class

As described in the section on method, the boys in the project were of two types--boys from homes where interest, parental background, and finances favored college entrance (i.e. high SES boys) and boys from homes where these were lacking (low SES boys). Because of these differences, all of the change comparisons were made by social class (high SES = classes 1 and 2, low SES = classes 3 through 7). In Table 3 are reported the changes in n Achievement score divided by social class. In both lower and upper class groups, experimental Ss increase significantly more than control Ss.

Insert Table 3 about here

While Mann-Whitney U-Tests indicated no significant differential

changes in Stanford Achievement Test scores, MAS, TAS, or summer school grades, there were differential changes in school grades in both the January 1962 and January 1963 followup periods. These effects are reported in Tables 4 and 5 for the high SES and low SES groups respectively.

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Insert Tables 4 and 5 about here

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The total grade average of high SES experimentals improved significantly more than controls in the January 1962 followup and in the January 1963 followup. In addition, high SES experimentals improved significantly more than controls in English and mathematics in 1962. No subject areas were significant in the 1963 followup.

The trend reported for high SES experimentals was reversed for low SES experimentals. In most cases they improved less than control subjects although these only approached significance in science and mathematics in the January 1962 followup and in mathematics in the 1963 followup. Low SES subjects showed no significant differential changes in total grade average in either followup period.

In Figure 1 the total grade averages are plotted for high SES and low SES experimentals and controls for the initial pretest and the two followup periods. The high SES experimental group is the only group to show an improvement in grade average in the 1963 followup. This group shows a twelve-point increase in grade average in the 1963 followup, moving from a D- to a C average.

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Insert Figure 1 about here

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Analysis of Change Within the Experimental Group

To analyze patterns of change within the experimental group, seven variables were intercorrelated: three predictor variables--social class, initial n Achievement score and WISC IQ score; three participation variables--ranking on course participation by the counselor, a moderate risk-taking score from the Business Game, and the change in n Achievement score from the pretest to the August posttest; and the criterion variable--change in school grades. Changes in grades in the January 1962 followup were used since using 1963 changes would too much reduce the already small sample. These correlations are reported in Table 6.

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Insert Table 6 about here

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None of the three predictor variables showed significant correlations with change in school grades although when SES was divided into high and low groups as was done for control group comparisons, a media test showed that high SES boys tended to improve more than low SES boys ($X^2 = 7.29$, $p < .01$). None of the predictor variables were significantly related to participation variables, although there was a weak relationship between IQ and Business Game and IQ and n Achievement.

Two of the participation variables can be seen as measures of how well the boys learned major themes of the course. The Business Game

score gives an indication of the boy's ability to take moderate risks and use the results of his previous experience (i.e. feedback) at the end of the course. This score correlated .63 with change in school grades. The change in n Achievement score gives an indication of how well the boy learned to think like a person with high need for achievement. This score correlated .42 with change in grades. The multiple correlation coefficient of Business Game score and change in n Achievement with change in school grades was .68 ($p < .025$, one-tailed). The third participation variable, the participation ranking by the counselor, did not correlate significantly with the criterion, although it did with change in n Achievement.

## Discussion

The fact that improvement in experimental group grades differs significantly from control group improvement in the 1963 but not the 1962 followup seems to be based mainly on a decrease in the control group improvement score in 1963. This would suggest that while the summer school alone gave some boost to the grades, there is a tendency for this effect to decay over time, while the addition of the AMTP to the summer program seems to promote a more permanent and perhaps increasing improvement in school grade average. This effect is seen most strikingly when the data are analyzed by social class (see Figure 1).

The significant differences in subject areas, especially when controls improve more than experimentals, are difficult to explain with the data available.

The strong differential effect that social class had on change in grades requires some examination. The fact that only high social class experimental boys seemed to benefit significantly from the AMTP might be explained in two ways.

One might reason that the course was designed to appeal more to boys from the upper classes where education is valued more than to lower class boys (Kahl, 1952). The course was, in fact, pitched at a rather intellectual level and expounded high educational values--Harvard, research, and good grades. But if this argument were so, one would expect social class to be positively correlated with the participation variables--course participation ranking, Business Game score and change in n Achievement. As is indicated in Table 6, this is not the case. In addition, both high and low SES experimentals increased significantly more than controls in n Achievement score.

The alternative explanation is not based on the differential reaction of high and low SES boys to the AMTP but on the different environments to which they returned. An underachieving upper class boy finds himself in sharp dissonance with his subculture. There is constant pressure for him to achieve and do well in school. The underachiever from the lower classes is not pushed by such strong values on achievement and hence he is more likely to be in harmony with his subculture. Hence when the boys returned home after learning new techniques for achieving, the high SES boy used these techniques to alleviate the tensions his failure to achieve had created. Although we would have to assume

that the low SES boy also felt some of these tensions (his parents did care enough to send him to the summer school), the aspirations that the subculture holds for the boy are not so high (Kahl, 1952).and thus he need not improve his performance as much to bring himself in harmony with his subculture.

The experimental group's improvement over controls in school grades lends encouraging support to the hypothesis that teaching underachieving boys the characteristics of the person with high achievement motivation can lead to better academic performance. The hypothesis is further supported by the high correlation of change in n Achievement and Business Game score with improvement in school grades in the experimental group.

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## Footnote

1. This research was carried out with funds granted by the Carnegie Foundation to David C. McClelland of Harvard University, under whose auspices this study was conducted. Thanks are due to the Department of Education and officials of Brown University whose cooperation and support made this study possible.

Table 1

Change in n Achievement

| Testing Intervals | Exper. Group Mean Change | Control Group Mean Change | Significance of Difference[a] |
|---|---|---|---|
| Pretest to August 1961 Posttest | D = 6.72<br>n = 18 | D = -.34<br>n = 32 | $p < .005$ |
| Pretest to April 1962 Followup | D = 4.4<br>n = 10 | D = -3.8<br>n = 17 | $p < .025$ |

[a]Mann-Whitney U-Test, one-tailed probability.

Table 2

Change in School Grades: All Boys

| School subjects | Exper. Group Mean Change | Control Group Mean Change | Significance of Difference[a] |
|---|---|---|---|
| | Pretest to January 1962 followup | | |
| Total grade average | D = 6.3<br>n = 18 | D = 4.1<br>n = 31 | NS |
| English | D = 8.3<br>n = 18 | D = 3.1<br>n = 30 | $p < .03$ |
| Science | D = -4.0<br>n = 10 | D = 7.0<br>n = 21 | $p < .02$[b] |
| Foreign lang. | D = 8.1<br>n = 12 | D = 5.1<br>n = 14 | NS |
| Mathematics | D = 6.1<br>n = 17 | D = 4.8<br>n = 28 | NS |
| History/civics | D = 6.3<br>n = 7 | D = 2.9<br>n = 20 | NS |
| | Pretest to January 1963 followup | | |
| Total grade average | D = 7.1<br>n = 12 | D = 2.6<br>n = 24 | $p < .05$ |
| English | D = 8.7<br>n = 12 | D = 4.7<br>n = 23 | NS |
| Science | D = 3.5<br>n = 6 | D = 9.2<br>n = 15 | NS |
| Foreign lang. | D = 7.8<br>n = 7 | D = -0.9<br>n = 10 | NS |
| Mathematics | D = 1.7<br>n = 12 | D = 3.8<br>n = 20 | NS |
| History/civics | D = 9<br>n = 8 | D = 4.9<br>n = 15 | NS |

[a]Mann-Whitney U-Test, one-tailed probability.

[b]Contrary to prediction; two-tailed probability.

Table 3

Change in n Achievement by Social Class

| Testing Interval | Exper. Group Mean Change | Control Group Mean Change | Significance of Difference[a] |
|---|---|---|---|
| | **High Social Class (1 and 2)** | | |
| Pretest to August Posttest | D = 8.4<br>n = 9 | D = -0.3<br>n = 9 | $p < .05$ |
| Pretest to April Followup | D = 5.7<br>n = 7 | D = -5.8<br>n = 5 | $p < .025$ |
| | **Low Social Class (3 through 7)** | | |
| Pretest to August Posttest | D = 5.0<br>n = 9 | D = -.6<br>n = 20 | $p < .01$ |
| Pretest to April Followup | D = 0.3<br>n = 3 | D = -3.2<br>n = 12 | $p < .10$ |

[a]Mann-Whitney U-Test, one-tailed probability.

Table 4

Change in Social Class: High Social Class Boys

| School subjects | Exper. Group Mean Change | Control Group Mean Change | Significance of Difference[a] |
|---|---|---|---|
| | Pretest to January 1962 followup | | |
| Total grade average | D = 9.5<br>n = 10 | D = 1.8<br>n = 13 | $p < .005$ |
| English | D = 9.4<br>n = 10 | -D = 0.7<br>n = 13 | $p < .01$ |
| Science | D = 0.5<br>n = 3 | D = 4.4<br>n = 8 | NS |
| Foreign lang. | D = 10.5<br>n = 8 | D = 10.0<br>n = 3 | NS |
| Mathematics | D = 13.0<br>n = 10 | D = -12.0<br>n = 11 | $p < .01$ |
| History/civics | D = 7.2<br>n = 4 | D = 4.6<br>n = 7 | NS |
| | Pretest to January 1963 followup | | |
| Total grade average | D = 11.9<br>n = 6 | D = 1.9<br>n = 11 | $p < .05$ |
| English | D = 9.5<br>n = 6 | D = 3.7<br>n = 11 | NS |
| Science | D = 8.8<br>n = 5 | D = 7.1<br>n = 8 | NS |
| Foreign lang. | D = 9.8<br>n = 5 | D = -2.0<br>n = 8 | NS |
| Mathematics | D = 11.2<br>n = 6 | D = 3.0<br>n = 10 | NS |
| History/civics | D = 6.0<br>n = 4 | D = 5.2<br>n = 6 | NS |

[a]Mann-Whitney U-Test, one-tailed probability.

Table 5

Change in School Grades: Low Social Class Boys

| School subjects | Exper. Group Mean Change | Control Group Mean Change | Significance of Difference [a] |
|---|---|---|---|
| | Pretest to January 1962 followup | | |
| Total grade average | D = 2.4<br>n = 8 | D = 5.7<br>n = 18 | NS |
| English | D = 7.0<br>n = 8 | D = 4.8<br>n = 17 | NS |
| Science | D = -10.7<br>n = 4 | D = 15.8<br>n = 14 | $p < .10$ |
| Foreign lang. | D = -3.2<br>n = 4 | D = 3.7<br>n = 11 | NS |
| Mathematics | D = -3.7<br>n = 7 | D = 8.6<br>n = 17 | $p < .10$ |
| History/civics | D = 5.0<br>n = 3 | D = 3.4<br>n = 11 | NS |
| | Pretest to January 1963 followup | | |
| Total grade average | D = 2.3<br>n = 6 | D = 3.2<br>n = 13 | NS |
| English | D = 7.8<br>n = 6 | D = 6.5<br>n = 13 | NS |
| Science | not enough cases for comparison | | |
| Foreign lang. | not enough cases for comparison | | |
| Mathematics | D = -7.6<br>n = 6 | D = 4.4<br>n = 10 | $p < .05$ |
| History/civics | D = 12.0<br>n = 4 | D = 4.7<br>n = 9 | NS |

[a] Mann-Whitney U-Test, two-tailed probability (contrary to prediction).

Table 6

Experimental Group Intercorrelations[a]

| | social class | initial n Ach | IQ | partici-pation | bus. game | n Ach change | change in grades |
|---|---|---|---|---|---|---|---|
| **Predictor variables:** | | | | | | | |
| social class[b] | -- | | | | | | |
| initial n Ach | 22 | -- | | | | | |
| WISC IQ | -32 | -31 | -- | | | | |
| **Participation variables:** | | | | | | | |
| course participation[c] | -03 | -02 | -01 | -- | | | |
| bus. game score | -15 | 06 | 34 | 15 | -- | | |
| change in n Ach[d] | 11 | 02 | 35 | 58** | 25 | -- | |
| **Criterion variables:** | | | | | | | |
| change in grades[e] | 32 | -30 | 20 | 27 | 63*** | 42* | -- |

*p < .10 one-tailed.

**p < .02 one-tailed.

***p < .01 one-tailed.

[a] n = 18

[b] Scores inverted for ease of interpretation: 7= high SES, 1= low SES.

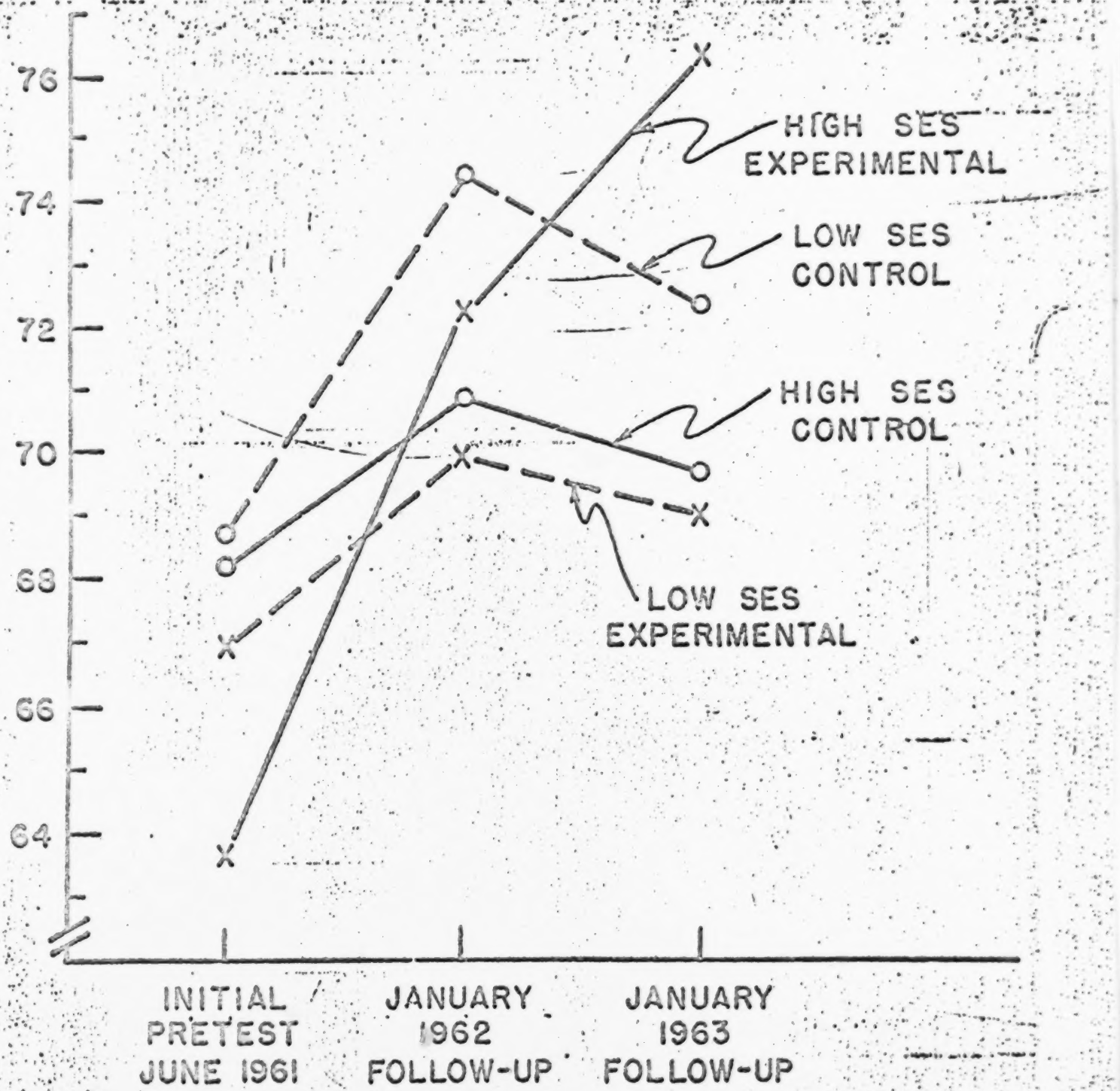
[c] All rank order correlations.

[d] Change to August posttest.

[e] Change to January 1962 followup.

## Figure Caption

Figure 1. School Grade Average in Pretest and Follow-up Periods



## Abstract

An experiment testing the effect of a training program in achievement motivation on the academic performance of underachieving high school boys. Twenty boys with IQs above 120 and school grades below C received the training program designed to teach characteristics of the person with high n Achievement in addition to an academic summer school program. They were compared to a control group of 37 similar boys who received only the academic program. A six-month followup revealed no significant differences between the groups in improvement in school grade average. In a one-and-a-half year followup, however, the total grade average of experimental subjects improved significantly more than the grades of controls ($p < .05$). Large social class differences were found. The grades of high social class (SES) experimentals improved significantly more than those of high SES controls ($p < .005$) while low SES experimentals did not increase more than low SES controls. In the experimental group, improvement in school grades was significantly correlated with participation variables--change in n Achievement and a Business Game performance score.